

Claim 1. (Amended) [In a] A polyamide molecule [which] that specifically binds to base pairs in the minor groove of a DNA molecule, [the improvement] said polyamide molecule comprising:

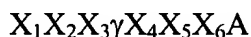
one or more amino acids comprising a moiety selected from the group consisting of N-methylpyrrole, 3-hydroxy-N-methylpyrrole, and N-methylimidazole, wherein one or more of said amino acid(s) are not α -amino acids; and

a positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 2. (Amended) A polyamide of claim 1 wherein the rigid group comprises a first and a second amino acid; said first amino acid being selected from the group consisting of arginine, proline, lysine, and hydroxyproline [and a derivative thereof]; and said second amino acid being selected from the group consisting of proline, glycine, serine, threonine, leucine, isoleucine, valine, alanine, and hydroxyproline [and a derivative thereof].

Claim 6. (Amended) A polyamine of claim 1 wherein said positively charged group is selected from the group consisting of arginine, lysine, and histidine [and a derivative thereof].

Claim 12. (Amended) A polyamide of claim 1 having the formula:

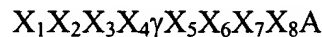


wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ -aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

X_1/X_6 , X_2/X_5 , and X_3/X_4 represent three carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of 3-hydroxy-N-methylpyrrole/N-methylpyrrole (Hp/Py), N-methylpyrrole/3-hydroxy-N-methylpyrrole (Py/Hp), N-methylpyrrole/N-methylimidazole (Py/Im), N-methylimidazole/N-methylimidazole (Im/Py), and N-methylpyrrole/N-methylpyrrole (Py/Py) to correspond to the DNA base pair in the minor groove to be bound; and

B³ *cont'd*
A represents [a] said positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 14. (Amended) A polyamide of claim 1 having the formula:

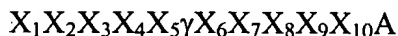


B⁴
wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ -aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

X_1/X_8 , X_2/X_7 , X_3/X_6 , and X_4/X_5 represent four carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of Hp/Py, Py/Hp, Py/Im, Im/Py, and Py/Py to correspond to the DNA base pair in the minor groove to be bound; and

A represents [a] said positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 16. (Amended) A polyamide of claim 1 having the formula:

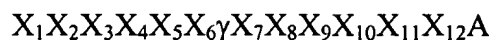


B⁶
wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ -aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

X_1/X_{10} , X_2/X_9 , X_3/X_8 , X_4/X_7 , and X_5/X_6 represent five carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of Hp/Py, Py/Hp, Py/Im, Im/Py, and Py/Py to correspond to the DNA base pair in the minor groove to be bound; and

A represents [a] said positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 18. (Amended) A polyamide of claim 1 having the formula:

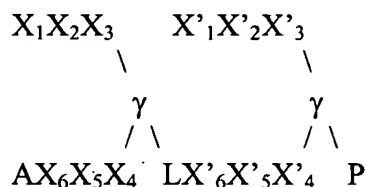


wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ -aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

X_1/X_{12} , X_2/X_{11} , X_3/X_{10} , X_4/X_9 , X_5/X_8 , and X_6/X_7 represent [three or four] six carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of Hp/Py, Py/Hp, Py/Im, Im/Py, and Py/Py to correspond to the DNA base pair in the minor groove to be bound; and

A represents [a] said positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 20. (Amended) A tandem-linked polyamide having the formula:



wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ -aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

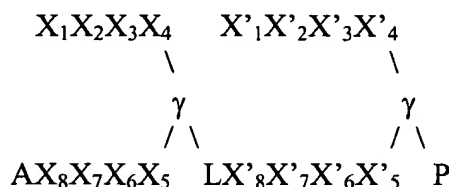
X_1/X_6 , X_2/X_5 , X_3/X_4 , X'_1/X'_6 , X'_2/X'_5 , and X'_3/X'_4 represent carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of Hp/Py, Py/Hp, Py/Im, Im/Py, and Py/Py to correspond to the DNA base pair in the minor groove to be bound;

L represents an amino acid linking group selected from the group consisting of β -alanine and 5-aminovaleric acid (δ);

P represents a polyamide selected from the group consisting of $X_1X_2X_3\gamma X_4X_5X_6$, $X_1X_2X_3X_4\gamma X_5X_6X_7X_8$, $X_1X_2X_3X_4X_5\gamma X_6X_7X_8X_9X_{10}$, and $X_1X_2X_3X_4X_5X_6\gamma X_7X_8X_9X_{10}X_{11}X_{12}$, where X_1 - X_{12} are independently selected from the group consisting of β -alanine, pyrrole, hydroxypyrrole and imidazole; and

A represents a positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 21. (Amended) A tandem-linked polyamide having the formula:



wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

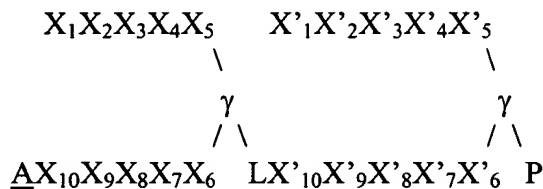
X_1/X_8 , X_2/X_7 , X_3/X_6 , X_4/X_5 , X'_1/X'_8 , X'_2/X'_7 , X'_3/X'_6 , and X'_4/X'_5 , represent carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of Hp/Py, Py/Hp, Py/Im, Im/Py, and Py/Py to correspond to the DNA base pair in the minor groove to be bound;

L represents an amino acid linking group selected from the group consisting of β -alanine and 5-aminovaleric acid (δ);

P represents a polyamide selected from the group consisting of $X_1X_2X_3\gamma X_4X_5X_6$, $X_1X_2X_3X_4\gamma X_5X_6X_7X_8$, $X_1X_2X_3X_4X_5\gamma X_6X_7X_8X_9X_{10}$, and $X_1X_2X_3X_4X_5X_6\gamma X_7X_8X_9X_{10}X_{11}X_{12}$, where X_1 - X_{12} are independently selected from the group consisting of β -alanine, pyrrole, hydroxypyrrole and imidazole; and

A represents a positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].

Claim 22. (Amended) A tandem-linked polyamide having the formula:



wherein γ is $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CONH}-$ hairpin linkage derived from γ -aminobutyric acid or a chiral hairpin linkage derived from 2,4-diaminobutyric acid;

X_1/X_{10} , X_2/X_9 , X_3/X_8 , X_4/X_7 , X_5/X_6 , X'_1/X'_{10} , X'_2/X'_9 , X'_3/X'_8 , X'_4/X'_7 , and X'_5/X'_6 represent carboxamide binding pairs which bind DNA base pairs and are selected from the group consisting of Hp/Py, Py/Hp, Py/Im, Im/Py, and Py/Py to correspond to the DNA base pair in the minor groove to be bound;

L represents an amino acid linking group selected from the group consisting of β -alanine and 5-aminovaleric acid (δ);

P represents a polyamide selected from the group consisting of $X_1X_2X_3\gamma X_4X_5X_6$, $X_1X_2X_3X_4\gamma X_5X_6X_7X_8$, $X_1X_2X_3X_4X_5\gamma X_6X_7X_8X_9X_{10}$, and $X_1X_2X_3X_4X_5X_6\gamma X_7X_8X_9X_{10}X_{11}X_{12}$, where X_1-X_{12} are independently selected from the group consisting of β -alanine, pyrrole, hydroxypyrrole and imidazole; and

A represents a positive patch consisting of a rigid group adjacent to a positively charged group [such that a positive charge is delivered to the phosphate backbone or the major groove of a DNA molecule].